

Integrated Soil Fertility Management (ISFM) on Coconut + Lanzones (*Lansium domesticum* Corr) Agro-ecosystem in Southern Mindanao, Philippines (1993 – 2007): with Emphasis on the Multi-Nutrient Coconut- Specific Mineral Fertilizer*.

Part II. Influence on Leaf Nutrient Levels and Selected Soil Properties

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Abstract

A 15- year (1993-2007) long-term integrated soil fertility management (ISFM) study on coconut ('Laguna' tall variety) + lanzones fruit tree ('Paete' variety) agro-ecosystem was conducted using five fertilizer combinations (FCs) in a dominantly tropical wet climate growing zone (Koppen-Geiger Climate Classification, Kottek et al 2006) of Davao, Southern Mindanao, Philippines (07°05'N 125°37'E. One of the objectives of the study was to determine the response of this agro-ecosystem to the combined application of inorganic multinutrient fertilizer (MNF): N+P+K+Cl+S+B (14% N-5% P₂O₅-20% K₂O, with 15.5% Cl, 4.5% S and 0.02% B) and organic fertilizer sources at different ratios by weight by tree (IF+OF at 1+0; 1+2; 2+4; 4+2 and 4+4) on: crop productivity; soil properties, and leaf nutrient levels of the agro-ecosystem.

The influence of ISFM and MNF on yields and profitability of the agro-ecosystem coconut and lanzones fruit tree crop (Part I) had been presented earlier in the CORD J. (Magat et al 2009)

Results as presented in the first part of the work report showed that the application of the multi-nutrient inorganic fertilizer even at its lowest rate for coconut (1 kg/tree/yr) produced a significant increase in annual nut and copra yield per ha from an average of 8,890 nuts or 1.6 tons to 3 - 4 tons after 2 years of fertilizer applications. The non-significant difference in nut and copra yields of fertilizer combinations (FCs) in almost all years showed that even with the application of FC-1 (1 kg of inorganic fertilizer), the lowest rate of the multi-nutrient fertilizer, even without organic fertilizer, an annual yield over 4 tons copra per ha (or over 17, 000 nuts per ha) was produced in most of years of production, seldom achieved in coconut farms in the country.

The improvement of coconut yield and very productive lanzones fruiting stage in this cropping system may be attributed to the significant influence of fertilizer combinations on the crops' leaf nutrient contents as N, P, K, Cl and B. The long term effect of organic fertilization contributed much to the improved or enhanced soil physical conditions as the soil bulk density. Soil chemical properties as soil acidity, organic carbon (C), organic matter, available phosphorus (P) and exchangeable potassium (K) were generally enhanced during the 15 years of coconut and lanzones cropping under ISFM with multi-nutrient fertilizer application.

This long-term coconut + lanzones cropping agro-ecosystem proved to be a sustainable farming system. The proper integrated soil fertility management (ISFM) as a major component of the integrated crop management (ICM) using the PCA-formulated crop-specific-fertilizer multi-nutrient 14(N)-5(P₂O₅)-20(K₂O)-15.5(Cl)-4.5(S)-0.02(B) even at the lowest rate of fertilization contributed to stable soils resulting to the total productivity of the coconut + lanzones fruit tree agro-ecosystem.

Keywords: Coconut, *Cocos nucifera*, lanzones, *Lansium domesticum*, coconut+ fruit tree ecosystem, inorganic multi-nutrient fertilizer, organic fertilizer, integrated soil fertility management, leaf mineral nutrients, crop-specific fertilizer

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